

Abstract

A voltage-controlled oscillator design is disclosed that provides greater tuning range than a prior art differential amplifier design using "varactor" diodes. The design employs CMOS capacitors to replace varactor diodes. The CMOS capacitors are formed from PMOS transistors in which the drain of the transistor is electrically connected to the source of the same transistor, so that voltage-dependant capacitors are formed between the gate-to-source terminals and the gate-to-drain terminals of the PMOS transistor. Secondly, the monolithic inductors employed in the prior art are replaced by "active" inductors: the combination of a resistor connected in series with the gate of an NMOS transistor, where the potential at the drain of the NMOS transistor is held below that of the second terminal of the resistor by at least the threshold, or turn-on voltage, of the transistor. The resistor/transistor combination acts inductively at the frequency of oscillation of interest.